



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/778,589	02/07/2001	Ali S. Khayrallah	4015-891	4636

24112 7590 09/07/2004

COATS & BENNETT, PLLC  
P O BOX 5  
RALEIGH, NC 27602

EXAMINER

CHANG, EDITH M


ART UNIT

PAPER NUMBER

2637

DATE MAILED: 09/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/778,589	<b>Applicant(s)</b>  KHAYRALLAH, ALI S.	
	<b>Examiner</b> Edith M Chang	<b>Art Unit</b> 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>05162001</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

In age 1, lines 1-2, the information regarding the early filing date should be in the Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11; In page 8 line 4, the “demodulator 203” should be “demodulator 302”.

Appropriate corrections are required.

### *Claim Objections*

2. Claims 5-6, 8-11, 29-30 and 38-40 objected to because of the following informalities:

Claim 5, line 1: “a first input” is suggested changing to “said first input”;

line 2: “transmit symbols” is suggested changing to “input symbols”.

Claim 8, line 1: “The method of claim 8” is suggested changing to “The method of claim 7”.

Claim 29, line 1: “comprises” is suggested changing to “comprise”.

Claim 38, line 2: “an equalizer” is suggested changing to “the equalizer” or “said equalizer”.

Claims 6, 9-11, 30, 39 and 40 are directly/indirectly depend on the objected claims 5, 8, 29 and 38.

Appropriate corrections are required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1, 13, 25, and 36 are single means claims. A single means claim, i.e., where a means recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. In re Hyatt, 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983) (A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor.). When claims depend on a recited property, a fact situation comparable to Hyatt is possible, where the claim covers every conceivable structure (means) for achieving the stated property (result) while the specification discloses at most only those known to the inventor.

With respect to claims 37-40, the construction of claims 37-40 does not correspond to the disclosure of drawings. For example, claim 37 recites a demodulator which is not shown in Figure 4, since claims 36-40 are directed to the Figure 4 only wherein an equalizer is recited in claim 36.

Art Unit: 2637

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 17-19 and 38-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17, line 1: "wherein demodulating a received signal" does not recite in the precedent claims.

Claim 38, line 1: "said differential decoder" lacks antecedent basis.

Claim 39, line 2: "said differential decoder" lacks antecedent basis.

Claim 41, line 1: "said differential decoder" lacks antecedent basis.

Claims 18-19, 40 and 42-43 are directly or indirectly depend on rejected claims 17, 38 and 41.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5-10, 12-16, 20-21, 23-27, 29-33, 36-39, 41 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Chouly et al. (US 5307377).

Regarding **claims 1 & 25**, in FIG.1A, FIG.2, and FIG.3, Chouly et al. discloses a method

Art Unit: 2637

and its apparatus of coding information. In FIG.3, the apparatus comprises a differential coder: the element 31 of FIG.3 is the differential coder. In FIG.9 and column 12 lines 25-42, the differential coder generates a transmit sequence  $X_1$  to  $X_7$  as the bits of one symbol by differentially coding selected bits  $IX_2$  to  $IX_3$  of the input sequence to produce  $X_2$  and  $X_3$  as cited in the claims.

Regarding **claims 2 & 26**, In FIG.9, Chouly et al. further discloses that  $X_2(t) = IX_2(t) \oplus X_2(t-1)$ , the element 83 provides the delay of  $X_2$  in turns it provides previous input symbols  $X_2(t-1) = IX_2(t-1) \oplus X_2(t-2)$ . Therefore, Chouly et al. discloses differentially coding one or more bits,  $X_2$  with respect to one or more bits from one or more previous input symbols  $IX_2(t-1)$ .

Regarding **claims 3, 5, 27 & 29**, In FIG.9, Chouly et al. further discloses differentially coding at least one protected bit of the input symbol  $Y_1$ , the  $X_3$  takes the protected bit  $Y_1$  which is protected by the convolution error correction scheme, and at least one unprotected bit  $IX_3$ .

Regarding **claims 6 & 30**, in FIG.9, Chouly et al. discloses that the unprotected bit  $X_3$  is differentially coding with respect to a protected bit of a previous transmit symbol  $X_3/Y_1$ .

Regarding **claim 7**, In FIG.1A, FIG.2 and FIG.3, Chouly et al. discloses the input sequence  $IX_1$  to  $IX_7$  based on an information sequence from the element 10 FIG.1A, the received signal in digital form.

Regarding **claims 8 & 31**, In FIG.1A block 12, block 22 in FIG.2 and FIG.3, Chouly et al. discloses the channel coder (the outer code: block 22 of FIG.2 in block 12 of FIG.1) generating channel coding bits of the information sequence to produce a coded/the input sequence ( $IX_1 \dots IX_7$  sequence in FIG.3).

Regarding **claims 9 & 32**, In FIG. 2 block 22 and column 7 lines 1-15, Chouly et al. discloses using an unequal error protection scheme, the block code in the outer/external code.

Regarding **claims 10 & 33**, In FIG.10 Chouly et al. discloses an interleaver (the block 91, the interlace), in column 12 lines 43-45 wherein the interlace of the external encoder 22 (the outer code 22 in FIG.2) is arranged ahead of the internal code (the inner coder 24). The interleaver interleaves bits output by the outer code (is the said channel coder in claim 8 or claim 31).

Regarding **claim 12**, In FIG.1A block 13, Chouly et al. discloses modulating a carrier with the transmit sequence.

Regarding **claims 13 & 36**, in FIG.1B, FIG.11, and FIG.15, Chouly et al. discloses a method and its apparatus of decoding information. In FIG.15, the apparatus comprises an equalizer, the block 113 of FIG.1B and the block 124 of FIG.11/FIG.15. In FIG.16 and column 18 lines 35-56, the differential decoder decodes a received sequence  $\hat{X}_1$  to  $\hat{X}_7$  having  $\hat{X}_3$  and  $\hat{X}_2$  differentially coded, to generate an output sequence  $I\hat{X}_1$  to  $I\hat{X}_7$  as cited in the claims.

Regarding **claims 14 & 37**, in FIG.1B, Chouly et al. discloses the demodulator (block 113) to demodulating the received signal to generated the received sequence.

Regarding **claims 15 & 38**, in FIG.1B, FIG.15, Chouly et al. discloses the equalizer (block 113 and block 124 of FIG.11/FIG.15) performing demodulation to generate the received sequence and differential decoding to generate the output sequence jointly.

Regarding **claims 16 & 39**, in FIG.11, Chouly et al. discloses the channel decoder that is the block 122 to decode the output sequence from the differential decoder.

Regarding **claims 20 & 41**, in FIG.16, Chouly et al. discloses the decoder differentially one or more bits of a first receive symbol with respect to one or more bits from previous received symbols ( $I^{\wedge}X_1$ ,  $I^{\wedge}X_3$  take in bits from previous symbol, such as  $I^{\wedge}X_2(t) = X_2(t) \oplus X_2(t-1)$ ).

Regarding **claim 21**, in FIG.16, Chouly et al. discloses differentially decoding the protected bit  $Y_1$  of the received symbol.

Regarding **claim 23**, in FIG.16, Chouly et al. discloses differentially decoding the unprotected bit  $X_2$  of the received symbol.

Regarding **claims 24 & 43**, in FIG.16, Chouly et al. discloses differentially decoding the unprotected bit  $X_3$  with respect to a protected bit of a previous received symbol  $Y_1$ .

Regarding **claim 35**, in FIG.1A, Chouly et al. discloses a modulator, the block 13, following the differential coder, the block 12.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 11 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chouly et al. (US 5307377) in view of Lee et al. (US 6289486).

Regarding **claims 11 & 34**, Chouly does not specify the type of interleaver, however Lee et al. teaches the diagonal interleaver in FIG.5. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the diagonal interleaver taught by Lee et



Art Unit: 2637

al. in Chouly's interlace for the purpose of providing a flexible system to interleaving the input data regardless the frame size (column 2 line 60-67).

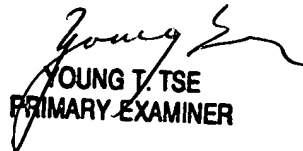
### ***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayanti Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang  
September 1, 2004

  
YOUNG T. TSE  
PRIMARY EXAMINER